1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>NFPA</th>
<th>HMIS</th>
<th>Personal Protective Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

- **Product code:** PM315
- **Product Name:** TITANIUM PLASMA EMISSION STANDARD, 1 ML = 1 MG TI
- **Chemical Name:** No information available
- **Synonyms:** No information available
- **Recommended use:** No information available
- **CAS #:** Mixture
- **RTECS #:** Not available
- **Formula:** No information available
- **CI#:** Not available
- **Supplier:** Spectrum Chemicals and Laboratory Products, Inc.
  14422 South San Pedro St.
  Gardena, CA 90248
  (310) 516-8000
- **Order Online At:** https://www.spectrumchemical.com
- **Emergency Telephone Number:** CHEMTREC: 1-800-424-9300
- **Contact Person:** Ibad Tirmiz (East Coast)
- **Contact Person:** Martin LaBenz (West Coast)

2. HAZARDS IDENTIFICATION

See Section 8.
2. HAZARDS IDENTIFICATION

<table>
<thead>
<tr>
<th>Odor:</th>
<th>Physical state:</th>
<th>Appearance:</th>
<th>Color:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slight. Pungent. Irritating.</td>
<td>Liquid.</td>
<td>No information available</td>
<td>No information available</td>
</tr>
</tbody>
</table>

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

POTENTIAL HEALTH EFFECTS

Principal Routes of Exposure:
Skin. Inhalation. Ingestion.

Acute Potential Health Effects:

Skin Contact:
Causes skin burns.

Eye Contact:
Causes eye burns.

Inhalation:
Causes chemical burns to the respiratory tract.

Ingestion:
Causes burns. Can burn mouth, throat, and stomach. May affect the cardiovascular system. May cause central nervous system effects. It may affect the kidneys. May affect respiration.

Chronic Potential Health Effects:

<table>
<thead>
<tr>
<th>Component</th>
<th>Carcinogen Status:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water 7732-18-5 (94-95)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Hydrogen chloride 7647-01-0 (5-6)</td>
<td>A4 - Not Classifiable as a Human Carcinogen by ACGIH Group 3 - Not classifiable as to its carcinogenicity to humans by IARC</td>
</tr>
<tr>
<td>Titanium 7440-32-6 (0.1)</td>
<td>No information available</td>
</tr>
</tbody>
</table>

Target Organs: Skin. Eyes. Respiratory system.

Mutagenic Effects:
For Hydrogen Chloride/Hydrochloric Acid:
Animal experiments showed mutagenic effects
Cytogenetic Analysis - chromosome aberration test (Chinese Hamster ovary):
Genotoxic effects were observed

Teratogenic Effects: No information available

Aggravated Medical Conditions: No information available

See Section 11 for additional Toxicological Information

POTENTIAL ENVIRONMENTAL EFFECTS

Product code: PM315 
Product name: TITANIUM PLASMA 
EMISSION STANDARD, 1 ML = 1 MG TI
3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>94-95</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>7647-01-0</td>
<td>5-6</td>
</tr>
<tr>
<td>Titanium</td>
<td>7440-32-6</td>
<td>0.1</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

General Advice: Poison information centres in each State capital city can provide additional assistance for scheduled poisons (13 1126). Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. First aider needs to protect himself.

Skin Contact: Wash off immediately with soap and plenty of water. Continue flushing with plenty of water for at least 15 minutes. Remove all contaminated clothes and shoes. Immediate medical attention is required. Call a physician immediately.

Eye Contact: Flush eye with water for 15 minutes. Immediate medical attention is required. Call a physician immediately.

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. WARNING! It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled or ingested material is toxic, infectious or corrosive. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required. Call a physician immediately.

Ingestion: Do not induce vomiting without medical advice. Do not give Sodium Bicarbonate (Baking Soda). Never give anything by mouth to an unconscious person. If victim is conscious, give water or milk. Immediate medical attention is required. Call a physician or Poison Control Centre immediately.

Notes to Physician: Treat symptomatically

5. FIRE-FIGHTING MEASURES

Flammable Properties

Flashpoint (°C/°F): No information available.

Flash Point Tested according to: Not available

Lower Explosion Limit (%): No information available

Upper Explosion Limit (%): No information available

Autoignition Temperature (°C/°F): No information available

Suitable Extinguishing Media: The product is not flammable. If it is involved in a fire, extinguish the fire using an agent suitable for the type of surrounding fire.

Unsuitable Extinguishing Media: No information available.

Product code: PM315

Product name: TITANIUM PLASMA

EMISSION STANDARD, 1 ML = 1 MG TI
Hazardous Combustion Products: No information available.

Specific hazards:
Contact with metals may evolve flammable hydrogen gas. Calcium carbide reacts with hydrogen chloride gas with incandescence. Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine. Rubidium acetylene carbide burns with slightly warm hydrochloric acid. Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas that is spontaneously flammable in air is evolved. Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammable gas. Cesium acetylene carbide burns in hydrogen chloride gas. Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute. Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction: Acetic anhydride AgClO + CCl4 Alcohols + hydrogen cyanide, Aluminum-Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide Ca3P2 Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO4 Hexalithium disilicide H2SO4 Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl), Sodium hydroxide Sodium tetraselenium, Sulfonic acid, Tetraselenium tetranitride, U3P4, Vinyl acetate. Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

Special Protective Equipment for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

Specific Methods: No information available.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Use personal protective equipment. Avoid contact with skin, eyes and clothing.

Environmental Precautions:
Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not let product enter drains. Do not flush into surface water or sanitary sewer system. Prevent entry into waterways, sewers, basements or confined areas.

Methods for Cleaning Up:
Neutralize with Sodium carbonate or Sodium bicarbonate. Dilute with water. Absorb spill with inert material (e.g. vermiculite, dry sand or earth), then place in a suitable chemical waste container. Clean contaminated surface thoroughly.
7. HANDLING AND STORAGE

Handling

Technical Measures/Precautions:
Use only in area provided with appropriate exhaust ventilation. Keep away from incompatible materials.

Safe Handling Advice:
Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Do not ingest. Do not breathe vapors or spray mist. Handle in accordance with good industrial hygiene and safety practice.

Storage

Technical Measures/Storage Conditions:
Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. May corrode metallic surfaces. Do not store in uncoated metallic containers. Store in a segregated and approved area. Store away from incompatible materials.

Incompatible Materials:

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures to reduce exposure:
Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Personal Protective Equipment

Eye protection: Face-shield.

Skin and body protection: Chemical resistant protective suit. Gloves. boots.

Respiratory protection: Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

Hygiene measures: Avoid contact with skin, eyes and clothing. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product.

National occupational exposure limits

United States

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>AIHA WHEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water - 7732-18-5</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Hydrogen chloride - 7647-01-0</td>
<td>5 ppm Ceiling 7 mg/m³ Ceiling</td>
<td>5 ppm Ceiling 7 mg/m³ Ceiling</td>
<td>2 ppm Ceiling</td>
<td>None</td>
</tr>
<tr>
<td>Titanium - 7440-32-6</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
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</tbody>
</table>

Canada

<table>
<thead>
<tr>
<th>Components</th>
<th>Alberta</th>
<th>British Columbia</th>
<th>Ontario</th>
<th>Quebec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water 7732-18-5</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Hydrogen chloride 7647-01-0</td>
<td>2 ppm Ceiling 3 mg/m³ Ceiling</td>
<td>2 ppm Ceiling</td>
<td>2 ppm Ceiling</td>
<td>5 ppm Ceiling 7.5 mg/m³ Ceiling</td>
</tr>
<tr>
<td>Titanium 7440-32-6</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Australia and Mexico

Product code: PM315
Product name: TITANIUM PLASMA
EMISSION STANDARD, 1 ML = 1 MG TI
Components Australia Mexico
Water 7732-18-5 None None
Hydrogen chloride 7647-01-0 None 5 ppm Ceiling 7 mg/m³ Ceiling
Titanium 7440-32-6 None None

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid.
Flash point (°C): No data available
Autoignition Temperature (°C/°F): No information available
pH: No information available
Evaporation rate: No information available
Odor threshold (ppm): No information available

Appearance: No information available
Taste No information available
Lower Explosion Limit (%): No information available
Melting point/range(°C/°F): No information available
Specific gravity: 1.0-1.1
Bulk density: No information available
Vapor density: No information available
Partition coefficient (n-octanol/water): No information available

Color: No information available
Molecular/Formula weight: No information available
Upper Explosion Limit (%): No information available
Boiling point/range(°C/°F): No information available
Density (g/cm³): No information available
Vapor pressure @ 20°C (kPa): No information available
VOC content (g/L): No information available
Miscibility: No information available

Solubility: No information available

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions
Conditions to avoid: Stable at normal conditions
Possibility of Hazardous Reactions:

For Hydrogen chloride or concentrated Hydrochloric Acid:
Reacts with most metals to produce flammable Hydrogen gas.
Sodium reacts very violently with gaseous hydrogen chloride.
Calcium phosphide and Hydrochloric acid undergo a very energetic reaction.
Hydrogen chloride reacts with oxidizers releasing chlorine gas.
Hydrogen chloride gas is emitted when Hydrochloric acid comes in contact with Sulfuric acid.
Adsorption of Hydrochloric acid onto Silicon dioxide results in exothermic reaction.
Hydrogen chloride causes aldehydes and epoxides to violently polymerize.
Reacts violently with bases, oxidizers forming toxic chlorine gas.
Reacts, often violently or vigorously or exothermically, with acetic anhydride, active metals, aliphatic amines, alkanolamines, alkyne oxides, aromatic amines, amides, 2-aminoethanol, ammonia, ammonium hydroxide, calcium phosphate, chlorosulfonic acid, ethylene diamine, ethyleneimine, epichlorohydrin, isocyanates, metal acetylides, oleum, organic anhydrides, perchloric acid, 3-propiolactone, uranium phosphide, sulfuric acid, vinyl acetate, vinylidene fluoride, alcohols + hydrogen cyanide, Aluminum phosphate, Aluminum-titanium alloys, 2-Amino ethanol, Ammonium hydroxide, Ammonium, 1,4-Benzquinone diimine, Cesium telluroacetylated, Chlorine + dinitroanilines, Chloroacetaldehyde oxide, Cyanogen chloride, 1,1-Difluoroethylene, dinitroanilines, Ethylene, Ethyl 2-formylpropionate oxime, Hexalithium disilicide, Hydrogen peroxide, Methyl vinyl ether, Nitric acid + glycerol, Potassium, Potassium permanganate, beta-Propiolactone, Propylene oxide, Rubidium acetylide, Silver chloride, Sodium 2-allyloxy-6-nitrophenylpyruvate oxime, Sodium hydroxide, Sodium teranitride, 2,4,6-Tri(2-acetylhydrazino)-1,3,5-trinitrobenzene, Sulfonic acid, Cesium cyanotridehydrodecaborate(2-), Potassium ferricyanide, Vinylidene fluoride, Potassium ferrocyanide, Ammonium hexacyanofoamate (II).
Reaction with oxidizers such as permanganates, chlorates, chlorites, and hypochlorites may produce chlorine or bromine gas.
Reacts vigorously with alkalies and with many organic materials.
Cesium acetylene carbide burns in hydrogen chloride gas.
Lithium silicide in contact with hydrogen chloride becomes incandescent.
Magnesium boride in contact with concentrated hydrochloric acid produces spontaneously flammable gas.
Rubidium acetylene carbide burns with slightly warm hydrochloric acid.
Rubidium carbide ignites in contact with hydrochloric acid unless acid is dilute.
Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine.
Calcium carbide reacts with hydrogen chloride gas with incandescence.
Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg C.
Reaction of silver perchlorate with carbon tetrachloride in presence of small amount of hydrochloric acid produces trichloromethyl perchlorate, which detonates @ 40 deg C.
Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute.
Hydrochloric acid in the presence of alcohol and glycols results in dehydration reactions.
Hydrogen chloride gas can react with formaldehyde to form bis(chloromethyl)ether, a human carcinogen.
Exothermic reaction with water
Attacks some plastics, rubber, and coatings.

Polymerization:

Hazardous polymerisation does not occur

Corrosivity:

Severe corrosive effect on 304 Stainless Steel. Severe corrosive effect on 316 Stainless Steel. Severe corrosive effect on Copper and copper alloys. Severe corrosive effect on Bronze. Severe corrosive effect on Brass.

Product code: PM315
Product name: TITANIUM PLASMA
EMISSION STANDARD, 1 ML = 1 MG TI
11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

Water - 7732-18-5
- LD50/oral/rat = > 90 mL/kg Oral LD50 Rat
- LD50/oral/mouse = No information available
- LD50/dermal/rat = No information available
- LD50/dermal/rabbit = No information available
- LC50/inhalation/rat = No information available
- LC50/inhalation/mouse = No information available
- Other LD50 or LC50 information = No information available

Hydrogen chloride - 7647-01-0
- LD50/oral/rat = 700 mg/kg Oral LD50 Rat (test substance: 31.5% hydrochloric acid solution)
- LD50/oral/mouse = No information available
- LD50/dermal/rat = No information available
- LD50/dermal/rabbit = > 5010 mg/kg Dermal LD50 Rabbit (Test substance: 31.5% hydrochloric acid solution)
- LC50/inhalation/rat = 3124 ppm Inhalation LC50 Rat 1 h
  1562 ppm 4 h
- LC50/inhalation/mouse = 1108 ppm 1 h
- Other LD50 or LC50 information = 900 mg/kg oral LD50 Rabbit (no information on test substance)

Titanium - 7440-32-6
- LD50/oral/rat = No information available
- LD50/oral/mouse = No information available
- LD50/dermal/rat = No information available
- LD50/dermal/rabbit = No information available
- LC50/inhalation/rat = No information available
- LC50/inhalation/mouse = No information available
- Other LD50 or LC50 information = No information available

Product Information

- LC50/inhalation/rat = No information available
- LC50/inhalation/mouse = No information available
- LD50/dermal/rabbit = No information available
- LD50/dermal/rat = No information available
- LD50/oral/mouse = No information available
- LD50/oral/rat = No information available

Local Effects

- Skin irritation: Corrosive. Causes burns.
- Eye irritation: Corrosive. Causes burns.
Inhalation: Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and laryngeal irritation, and burning, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well has headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure, dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also occur, particularly if exposure is prolonged. May affect the liver.

Ingestion: Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomiting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophageal, gastric, pyloric). May affect behavior (excitation), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis). Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel.

Sensitization: No information available

Chronic Toxicity

Chronic Toxicity Prolonged or repeated inhalation and/or ingestion may affect liver, and cause bleeding of nose and gums, nasal and oral mucosal ulceration, conjunctivitis. It may also affect respiratory tract (changes in pulmonary function, chronic bronchitis, overt respiratory tract abnormalities), teeth (yellowing of teeth and erosion of tooth enamel), kidneys, and behavior/central nervous system (muscle contraction or spasticity).

Prolonged or repeated skin contact may cause dermatitis.

Prolonged or repeated eye contact with vapor/mist can cause conjunctivitis.

Carcinogenic Effects: Not considered carcinogenic

<table>
<thead>
<tr>
<th>Components</th>
<th>NTP</th>
<th>IARC</th>
<th>OSHA HCS - Carcinogens</th>
<th>ACGIH - Carcinogens</th>
<th>Australia - Prohibited Carcinogenic Substances</th>
<th>Australia - Notifiable Carcinogenic Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>Not listed</td>
<td>Group 3 - Monograph 54 [1992]</td>
<td>Not listed</td>
<td>44 Not Classifiable as a Human Carcinogen</td>
<td>Not listed</td>
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</tr>
<tr>
<td>Titanium</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Mutagenic Effects: For Hydrogen Chloride/Hydrochloric Acid:
Animal experiments showed mutagenic effects
Cytogenetic Analysis - chromosome aberration test (Chinese Hamster ovary): Genotoxic effects were observed

Reproductive Effects: For Hydrogen Chloride/Hydrochloric Acid
No information on reproductive toxicity effects on humans was found
May cause adverse developmental effects based on animal data
An increase in postnatal mortality was seen in experiments where rats were exposed to Hydrogen Chloride for 1 hour

Teratogenic Effects: No information available

Target Organs: Skin. Eyes. Respiratory system.
12. ECOLOGICAL INFORMATION

**ECOTOXICITY**

Toxicity to terrestrial and aquatic plants and animals: Information given is based on data on the components and the ecotoxicology of similar products

Ecotoxicity effects: Aquatic environment.

Aquatic toxicity:

Hydrogen chloride - 7647-01-0
Freshwater Fish Species Data: 282 mg/L LC50 Gambusia affinis 96 h static 1

Mobility: No information available

Persistence and degradability: No information available

Bioaccumulative potential: No information available

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging: Empty containers should be taken for local recycling, recovery or waste disposal

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Titanium</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

14. TRANSPORT INFORMATION

**DOT**

UN-No: UN1789
Proper Shipping Name: Hydrochloric acid (Solution)
Hazard Class: 8
Packing Group: None
Subsidiary Risk: Not applicable
Marine Pollutant: No data available
ERG No: 157
DOT RQ (lbs): No information available

**TDG (Canada)**

UN-No: UN1789
Proper Shipping Name: Hydrochloric acid (Solution)
Hazard Class: 8
Packing Group: II
Subsidiary Risk: No information available
Description: No information available

**ADR**

UN-No: UN1789
Proper Shipping Name: Hydrochloric acid (Solution)
Hazard Class: 8
15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Components</th>
<th>U.S. TSCA</th>
<th>Philippines (PICCS)</th>
<th>KOREA KECL</th>
<th>Japan ENCS</th>
<th>CHINA</th>
<th>Australia (AICS)</th>
<th>EINECS-No.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Present</td>
<td>Present KE-35400</td>
<td>Not present</td>
<td>Present</td>
<td>Present</td>
<td>Present 231-791-2</td>
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<tr>
<td>Hydrogen chloride</td>
<td>Present T</td>
<td>Present</td>
<td>Present KE-20189</td>
<td>Present (1)-215</td>
<td>Present</td>
<td>Present</td>
<td>Present 231-595-7</td>
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<tr>
<td>Titanium</td>
<td>Present</td>
<td>Present</td>
<td>Present KE-33881</td>
<td>Not present</td>
<td>Present</td>
<td>Present</td>
<td>Present 231-142-3</td>
</tr>
</tbody>
</table>

Product code: PM315  
Product name: TITANIUM PLASMA  
EMISSION STANDARD, 1 ML = 1 MG TI
U.S. Regulations

Hydrogen chloride

Massachusetts RTK: Present
Massachusetts EHS: extraordinarily hazardous
New Jersey RTK Hazardous Substance List: Present
New Jersey (EHS) List: Present
New Jersey - Discharge Prevention - List of Hazardous Substances: Present
New Jersey TCPA - EHS: 15000lbTQ
5600lbTQ
2000lbTQ
Pennsylvania RTK: Environmental hazard
Pennsylvania RTK - Environmental Hazard List Present
Michigan PSM HHC: = 5000 lb TQ
Minnesota - Hazardous Substance List: Present
New York Release Reporting - List of Hazardous Substances:
5000 lb RQ
100 lb RQ
Louisiana Reportable Quantity List for Pollutants: 5000lbfinal RQAs listed in 40 CFR 117.3 Table 117.3 and 40 CFR 302.4 Table 302.4
2270kgfinal RQAs listed in 40 CFR 117.3 Table 117.3 and 40 CFR 302.4 Table 302.4
5000lbRQAs listed in Louisiana Administrative Code, Title 33, Part 1, Subpart 2, Chapter 39, Subchapter E. Applies to unauthorized emissions based on total mass emitted into or onto all media within any consecutive 24-hour period
1000lbRQAs listed in Louisiana Administrative Code, Title 33, Part 1, Subpart 2, Chapter 39, Subchapter E. Applies to unauthorized emissions based on total mass emitted into the atmosphere
California Directors List of Hazardous Substances: Present
FDA - Food Additives Generally Recognized as Safe (GRAS): 21 CFR 182.1057

Titanium

New Jersey RTK Hazardous Substance List: Present
California Directors List of Hazardous Substances: Present


Chemicals Known to the State of California to Cause Cancer:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Chemicals Known to the State of California to Cause Reproductive Toxicity:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

<table>
<thead>
<tr>
<th>Components</th>
<th>Carcinogen</th>
<th>Developmental Toxicity</th>
<th>Male Reproductive Toxicity</th>
<th>Female Reproductive Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Not Listed</td>
<td>Not Listed</td>
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<tr>
<td>Titanium</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
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</tr>
</tbody>
</table>

CERCLA/SARA

<table>
<thead>
<tr>
<th>Components</th>
<th>CERCLA - Hazardous Substances and their Reportable Quantities</th>
<th>Section 302 Extremely Hazardous Substances and TPQs</th>
<th>Section 302 Extremely Hazardous Substances and RQs</th>
<th>Section 313 - Chemical Category</th>
<th>Section 313 - Reporting de minimis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>5000 lb final RQ</td>
<td>500 lb TPQ</td>
<td>None</td>
<td>None</td>
<td>1.0 % de minimis concentration</td>
</tr>
<tr>
<td>Titanium</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

U.S. TSCA

<table>
<thead>
<tr>
<th>Components</th>
<th>TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)</th>
<th>TSCA 8(d) - Health and Safety Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Titanium</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Canada

Product code: PM315
Product name: TITANIUM PLASMA
EMISSION STANDARD, 1 ML = 1 MG TI
WHMIS hazard class:
E  Corrosive material

Water
Uncontrolled product according to WHMIS classification criteria

Hydrogen chloride
A  D1A  E
E  0.036% in aqueous solution, 0.36% in aqueous solution, 3.6% in aqueous solution
D1B  E  28% in aqueous solution
D1A  E  31.45% in aqueous solution, 35.2% in aqueous solution

Canada Controlled Products Regulation:
This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

<table>
<thead>
<tr>
<th>Components</th>
<th>WHMIS Ingredient Disclosure List -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>1 %</td>
</tr>
</tbody>
</table>

Inventory

<table>
<thead>
<tr>
<th>Components</th>
<th>Canada (DSL)</th>
<th>Canada (NDSL)</th>
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</thead>
<tbody>
<tr>
<td>Water</td>
<td>Present</td>
<td>Not Listed</td>
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<tr>
<td>Hydrogen chloride</td>
<td>Present</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Titanium</td>
<td>Present</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>CEPA Schedule I - Toxic Substances</th>
<th>CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Not listed</td>
<td>Not listed</td>
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<tr>
<td>Hydrogen chloride</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>Titanium</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

EU Classification

R-phrase(s)
R36/37/38 - Irritating to eyes, respiratory system and skin.

S -phrase(s)
S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 1/2 - Keep locked up and out of the reach of children.

<table>
<thead>
<tr>
<th>Components</th>
<th>Classification</th>
<th>Concentration Limits:</th>
<th>Safety Phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
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<td>No information</td>
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</tbody>
</table>

Product code: PM315  
Product name: TITANIUM PLASMA  
EMISSION STANDARD, 1 ML = 1 MG TI
| Chemical     | Hydrogen Chloride: C;R35  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T;R23</td>
</tr>
<tr>
<td></td>
<td>Hydrochloric Acid:</td>
</tr>
<tr>
<td></td>
<td>+ hydrochloric acid ...</td>
</tr>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>C; R34</td>
</tr>
<tr>
<td></td>
<td>- Xi; R37</td>
</tr>
<tr>
<td>Concentration Limit(s)</td>
<td>C &gt;= 25 % C; R34-37</td>
</tr>
<tr>
<td></td>
<td>10 % &lt;= C &lt; 25 % Xi; R36/37/38</td>
</tr>
<tr>
<td></td>
<td>0.02%&lt;=C&lt;0.2% Xi;R36/37/38</td>
</tr>
<tr>
<td></td>
<td>0.2%&lt;=C&lt;0.5% C;R34</td>
</tr>
<tr>
<td></td>
<td>0.5%&lt;=C&lt;1% C;R20-34</td>
</tr>
<tr>
<td></td>
<td>1%&lt;=C&lt;5% C;R20-35</td>
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<tr>
<td></td>
<td>5%&lt;=C T;C;R23-35</td>
</tr>
<tr>
<td></td>
<td>Hydrochloric Acid:</td>
</tr>
<tr>
<td></td>
<td>S(1/2)-S26-S45</td>
</tr>
<tr>
<td>Titanium</td>
<td>No information</td>
</tr>
</tbody>
</table>

The product is classified in accordance with Annex VI to Directive 67/548/EEC

**Indication of danger:**

**Xi** - Irritant.

**16. OTHER INFORMATION**

The MSDS format complies with ANSI Z400.1/Z129.1-2010 standards.

**Preparation Date:** 08-Oct-2014

**Reason for revision:** Not applicable

**Prepared by:** Sonia Owen

**Literature reference:** No information available

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. The physical properties reported in this MSDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.

**Product code:** PM315  
**Product name:** TITANIUM PLASMA

EMISSION STANDARD, 1 ML = 1 MG Ti